3.2 Air Quality

Review of EIS Section and Previous Analysis

After reviewing the original analysis conducted for the 1992 Final EIS and conducting a field review of the project, the initial air quality analysis was deemed adequate. The definitions of the various air quality pollutants and their health effects were adequately described in the original discipline report and the 1992 Final EIS. In 1992, the study area complied with state and federal air quality standards for particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, and lead. A regional analysis was the only type of analysis necessary at that time for determining conformity to air quality standards. The original project was modeled for regional conformity using MOBILE 4.1 to determine emission factors that were used in a CALINE-3 dispersion model (U.S. Department of Transportation [USDOT] 2001). Updated CAL3QHC modeling of affected intersections at level of service (LOS) D, E, or F was conducted for nine affected intersections and one composite location comprising two intersections located close together as part of the updated environmental documentation. No impacts were identified in this analysis; therefore, no mitigation strategies were necessary.

Four monitoring locations were analyzed. Neither the 1-hour nor the 8-hour National Ambient Air Quality Standards (NAAQS) were exceeded for CO over the 1-year monitoring period studied. Table 3.2-1, which lists the current NAAQS, shows that some slight changes have been implemented since the air quality study was conducted in 1992. Of the seven pollutants currently listed in the standard, only six pollutants were listed, monitored, and analyzed in 1992. Table 3.2-1 includes the addition of PM with a diameter of less than 2.5 micrograms ($PM_{2.5}$) and the removal of the 1-hour ozone standard from the list of pollutant concentrations included in the 1992 Final EIS.

Methodology

This project, with the addition of an auxiliary lane and slight change in the alignment of the lanes and bridges, is included in the current Transportation Improvement Plan (TIP) (Washington Administrative Code [WAC] 173-420 1996). Puget Sound Regional Council (PSRC) modeled the regionally significant elements in MOBILE 6.2. On February 2, 2006, the U.S. Environmental Protection Agency (EPA) approved using the Washington State Intersection Screening Tool (WASIST) for determining CO emissions on Washington State projects. This tool was developed to use EPA-approved Mobile 6.2 tailpipe emission factors and runs as a simplified interface to the EPA approved CAL3QHC intersection dispersion model. This tool uses very conservative assumptions to determine CO emission levels for some commonly configured intersections, ramps, and roundabouts. Current regulations require all areas in nonattainment for CO or particulate matter with a diameter of less than 10 micrograms (PM_{10}) to be analyzed for project "hot spots." In discussions with PSRC and the Puget Sound Clean Air Agency (PSCAA), the air quality discipline team determined that this more protective and faster method for screening hot spots should be performed for the project.

TABLE 3.2-1
National Ambient Air Quality Standards

Pollutant	Primary Standard	Averaging Times	Secondary Standard
Carbon monoxide	9 ppm (10 mg/m^3)	8-hour[1]	None
	35 ppm (40 mg/m^3)	1-hour[1]	None
Lead	1.5 µg/m^3	Quarterly average	Same as primary standard
Nitrogen dioxide	0.053 ppm	Annual (arithmetic mean)	Same as primary standard
	(100 µg/m^3)		
Particulate matter (PM_{10})	50 µg/m^3	Annual[2] (arithmetic mean)	Same as primary standard
	150 µg/m^3	24-hour[1]	
Particulate matter ($PM_{2.5}$)	15.0 µg/m^3	Annual[3] (arithmetic mean)	Same as primary standard
	65 µg/m^3	24-hour[4]	
Ozone	0.08 ppm	8-hour[5]	Same as primary standard
Sulfur oxides	0.03 ppm	Annual (arithmetic mean)	--
	0.14 ppm	24-hour[1]	--
	--	3-hour[1]	0.5 ppm (1,300 µg/m^3)

Sources: PSCAA Regulation 1 (1994); 40 CFR Part 50 (1997); WAC chapters 173-470, 173-474, 173-175 (1987).
[1]Not to be exceeded more than once per year.
[2]To attain this standard, the 3-year average of the weighted annual mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.
[3]To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
[4]To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m^3.
[5]To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
mg/m^3 milligrams per cubic meter
µg/m^3 micrograms per cubic meter
ppm parts per million

The air quality discipline team identified and considered 12 intersections affected by the project. Of the 12 intersections, one intersection did not fall below LOS C, and it was screened out as not having a potential CO problem. For the remaining 11 intersections, we modeled nine of them individually using WASIST for 2005 existing, 2010 (year of open) no action, 2010 build, 2030 (horizon year) no action, and 2030 build. Since the remaining two intersections were so close together, we modeled them together as one location for 2005 existing, 2010 (year of open) no action, 2010 build, 2030 (horizon year) no action, and 2030 build. The 11 modeled intersections include the following:

1. SR 520 westbound on- and off-ramp at Leary Way and West Lake Sammamish Parkway
2. SR 520 eastbound on and off-ramps and West Lake Sammamish Parkway
3. SR 202 and 170th Avenue NE
4. Avondale Way NE and Avondale Road Extension

5. Avondale Road Extension and NE Union Hill Road
6. SR5 20 westbound on-ramp and NE 76th Street and SR202
7. SR 520 eastbound off-ramp at SR 202
8. NE 70th Street and SR 202
9. SR 202 Bear Creek parking lot access at approximately 172nd Avenue NE
10. and 11. Composite modeling for (a) East Lake Sammamish Parkway and SR and 202, and (b) SR 202 and right off East Lake Sammamish Parkway

Please refer to the *Air Quality Technical Memorandum* (WSDOT 2006b) for the detailed air quality analysis.

Coordination Efforts

In February 1993, WAC 173-420-100, Transportation Project Conformity, became effective, which requires a project-level or hot-spot analysis of metered ramps and intersections affected by highway projects. This regulation includes a grandfather clause (paragraph (7)) that exempts projects in a conforming TIP that have completed the public comment period and SEPA environmental review requirements. In discussions with PSRC and PSCAA about the regulation and exemption allowed in WAC 173-420-100, paragraph (7), concerns were raised about these portions of the regulation that might still apply. Attempting to exempt this project would require additional research and consultation with PSRC and PSCAA, which could delay the project; therefore, the WSDOT determined that we would model all applicable affected intersections with the new WASIST CO screening tool.

Affected Environment

No notable changes to the project's affected environment have occurred since the 1992 Final EIS was completed. Climate and weather patterns remain unchanged; the pattern of warm, comparatively dry summers and mild, wet winters with local weather patterns affected by proximity of the Olympic and Cascade mountain ranges shield the area from storm patterns from Canada and the Pacific Ocean. Prevailing winds are from the south to southwest from October to March and from the north to northwest from April through September, with the highest winds occurring in the winter. Since the 1992 Final EIS, commercial and residential development has increased, resulting in a corresponding rise in vehicle trips in the study area. Figure 3.2-1 shows air quality maintenance areas in and around the study area.

Impacts

The eleven intersections with the worst LOS and highest volumes were selected, modeled, and analyzed. The WASIST model shows that for 2005, the existing condition, the three intersections would exceed the NAAQS 8-hour CO level of 9 part per million (ppm) (shown in bold in Table 3.2-2).

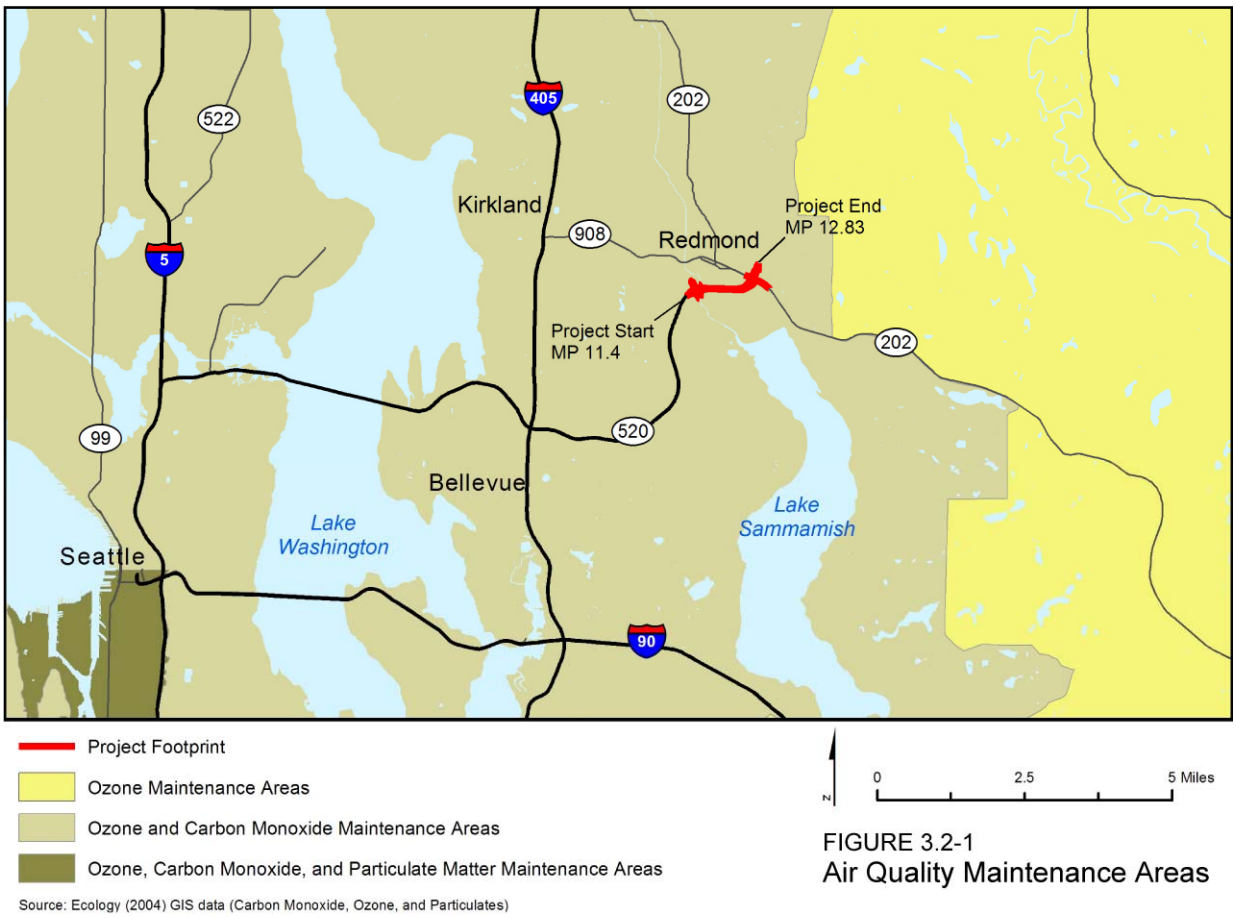

FIGURE 3.2-1
Air Quality Maintenance Areas

On the other hand, regional monitoring (field measurements) at various sites in Redmond and Bellevue indicate that no violations or exceedances occurred in 2005. The WASIST model showed that no intersections in the study area would exceed the NAAQS for either the 9-ppm, 8-hour standard or the 35-ppm, 1-hour standard for either the No-Action Scenario or the project improvements in either the year of opening (2010) or the horizon year (2030); therefore, there would be no impacts on the study area from CO.

The 1992 Final EIS qualitatively addressed the project's construction elements. Current regulations do not require air quality to be analyzed differently; therefore, impacts would be essentially the same. For construction activities, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO and nitrogen oxide (NOx) in exhaust emissions. If construction traffic were to reduce the speed of other vehicles in the area, then emissions from delayed traffic would increase slightly. These emissions would be temporary and limited to the immediate area around the construction site. Their contribution to total emissions in the study area would be small compared with automobile traffic because construction traffic would be a very small fraction of the total traffic in the area. Some phases of construction would result in short-term odors, particularly if asphalt were used for paving operations. People near the construction site might notice such odors, but the atmosphere would dilute the odor effect as distance from the site increased.

TABLE 3.2-2
Maximum Carbon Monoxide Concentrations

Intersection Location (Using PM Peak Hour except as noted)	CO Concentrations (ppm)	2005	2010		2030	
		Existing Conditions	No-Action	Build	No-Action	Build
1. SR 520 westbound on- and off-ramps and Leary Way and West Lake Sammamish Parkway: PM peak hour	1-hour	13.4	10.0	10.0	7.4	7.3
	8-hour	[1]**10.3**	7.9	7.9	6.1	6.0
2. SR520 eastbound on- and off-ramps and West Lake Sammamish Parkway	1-hour	11.4	8.9	9.2	7.0	6.9
	8-hour	8.9	6.8	7.3	5.8	5.7
3. SR 202 and 170th Avenue NE	1-hour	9.6	8.4	9.1	6.7	6.8
	8-hour	7.6	6.8	7.3	5.6	5.7
4. Avondale Way NE and Avondale Rd Extension	1-hour	10.8	8.4	8.4	6.6	6.8
	8-hour	8.5	6.8	6.8	5.5	5.7
5. Avondale Road Extension and NE Union Hill Road: AM peak hour	1-hour	10.8	8.8	8.9	6.8	6.8
	8-hour	8.5	7.1	7.1	5.7	5.7
6. SR 520 westbound on-ramp, NE 76th Street, and SR 202	1-hour	11.6	9.5	8.5	7.5	6.5
	8-hour	9.0	7.5	6.8	6.2	5.4
7. SR 520 eastbound off-ramp and SR 202	1-hour	11.6	9.4	8.9	7.4	6.9
	8-hour	9.0	7.5	7.1	6.1	5.7
8. NE 70th Street and SR 202	1-hour	12.0	9.7	9.7	7.3	7.5
	8-hour	[1]**9.3**	7.7	7.7	6.0	6.2
9. SR 202 Bear Creek parking lot access at approximately 172nd Avenue NE	1-hour	11.6	7.5	7.7	6.4	6.4
	8-hour	9.0	6.2	6.3	5.4	5.4
10 and 11. East Lake Sammamish Parkway and SR 202 and Redmond Way; SR 202 and right off-ramp East Lake Sammamish Parkway	1-hour	14.4	10.4	11.0	7.5	7.6
	8-hour	[1]**11.0**	8.2	8.6	6.2	6.2

[1]Exceeds 8-hour CO NAAQS; however, since in future years the project improvements and no-build scenario are below the NAAQS for 8-hour CO, the project still passes conformity.

Mitigation Measures

The existing year is modeled so that future year CO concentrations can be compared with existing concentrations to determine if the project would contribute to or worsen existing exceedances. Because there would be no exceedances of the NAAQS in future years, and because the project would not increase existing exceedances, no mitigation in the form of operational changes to the design would be required. Just as was concluded in the 1992 Final

EIS, no mitigation strategies are required because there are no adverse impacts identified by the current analysis.

Conformity Statement

WSDOT projects must comply with the project-level conformity criteria described in the EPA Conformity Rule and with WAC Chapter 173-420. The regional metropolitan planning organization (MPO) must also include the project in a conforming plan and TIP. As per 40 Code of Federal Regulations (CFR) Part 93, the following criteria must be met when determining project conformity. The project's conformity to the State Implementation Plan (SIP) is summarized below with each criterion (*indicated by italics*).

- *The conformity determination must be based on the latest planning assumptions*. The project's hot-spot analysis was conducted using the latest model MOBILE 6.2 emission factors using assumptions more conservative than those currently used for the Puget Sound region in PSRC planning document *Destination 2030* (PSRC 2004). The project hot spots are locations known to have high traffic volumes or poor traffic operations, which would result in high air pollution concentrations.
- *The conformity determination must be based on the latest emission estimation model available*. Emissions to determine conformity to the Metropolitan Transportation Plan (MTP) and TIP were calculated using MOBILE 6.2, the same emission model used to model conformity to the current Puget Sound Air Quality Maintenance Plans (PSRC 2001).
- *The MPO must make the conformity determination according to the consultation procedures of this rule and the implementation plan revision required by Section 51.396.* The project is in the PSRC's MTP (PSRC 2001) and in the TIP (WAC 173-420 1996).
- *There must be a current conforming plan and a current conforming TIP at the time of project approval*. There is a current conforming MTP and TIP.
- *The project must come from a conforming transportation plan and program.* The project is in the PSRC's MTP and in the TIP.
- *The project must not cause or contribute to any new localized CO or PM_{10} violation in CO and PM_{10} nonattainment or maintenance areas*. The project is located in a CO maintenance area (see Figure 3.2-1). The project would not create any new regional violations or contribute to the frequency or severity of any existing violations of the NAAQS. As shown in Table 3.2-2, CO would be reduced in 2030. The project is outside PM_{10} maintenance area boundaries and is in conformity for PM_{10}.
- *The project must comply with PM_{10} control measures in the applicable implementation plan*. Because the area is in conformity for PM, and outside PM_{10} maintenance area boundaries, no implementation plan is required.